Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

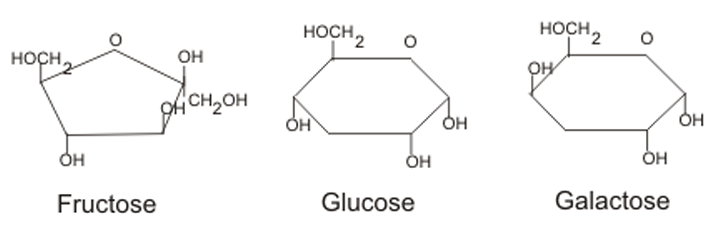
**Identifying the Macromolecules Worksheet**

Ms. OK, PreAP Biology, 2014-2015*.*

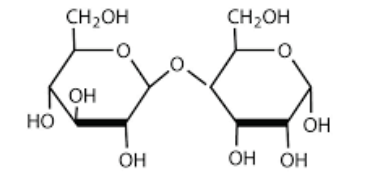
**Tips for Identifying Pictures of Macromolecules:**

***Carbohydrates***

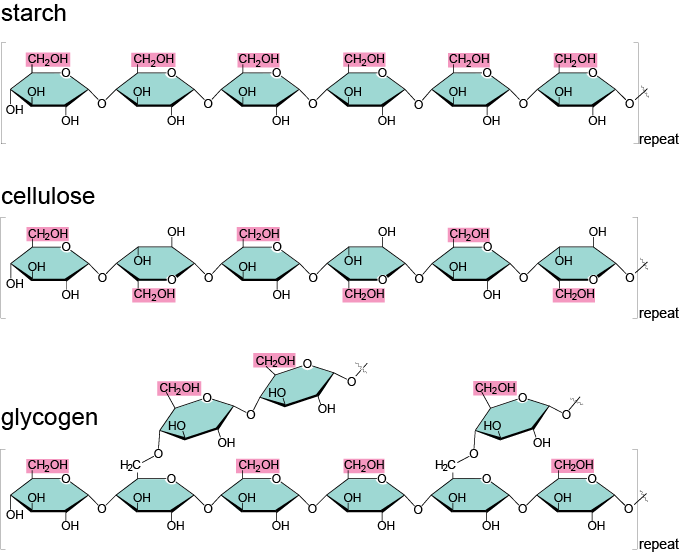
* Pictures of carbohydrate monomers (monosaccharides) have one ring of carbon atoms (looks like a pentagon or hexagon) with oxygen atoms and hydrogen atoms branching off the ring. (Remember: the basic chemical formula for a carbohydrate is C1H2O1 )



* Pictures of carbohydrate dimers (disaccharides) have two rings of carbon atoms joined together by bonds

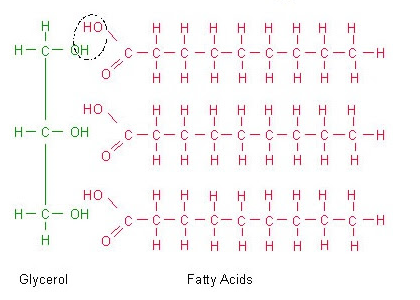


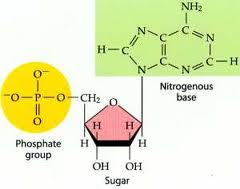
* Pictures of carbohydrate polymers (polysaccharides) have several rings of carbon atoms joined together by bonds.



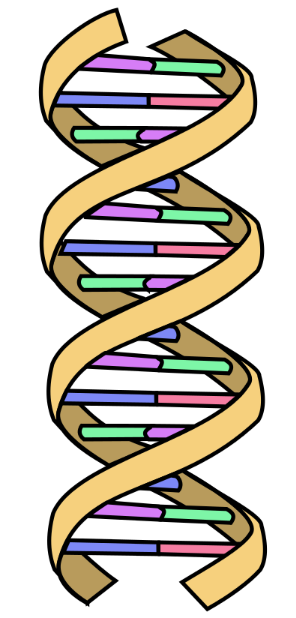
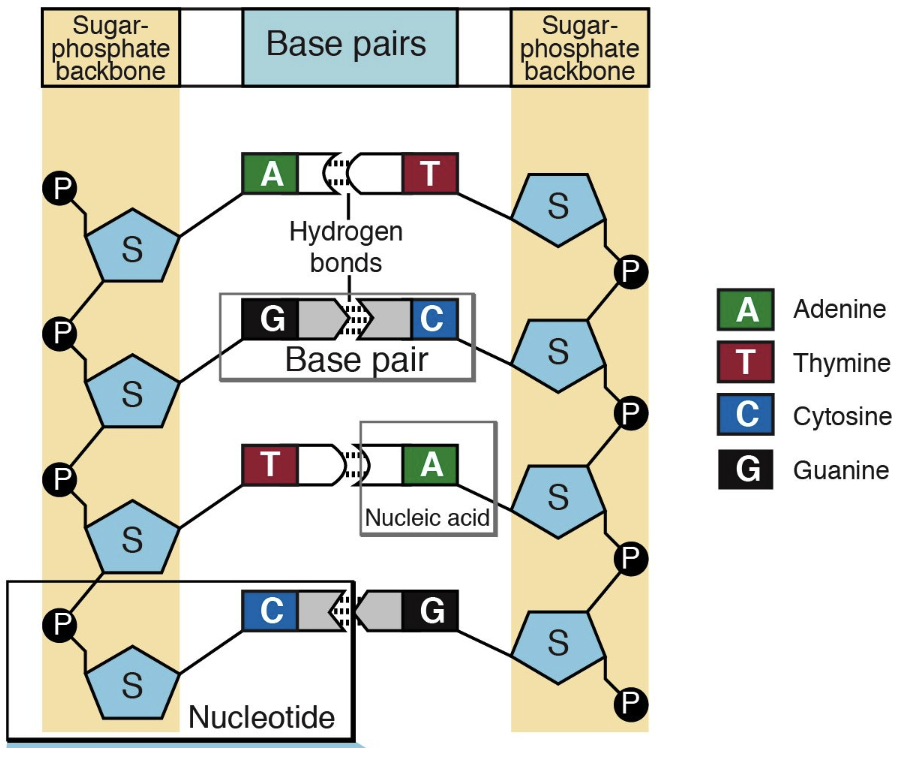
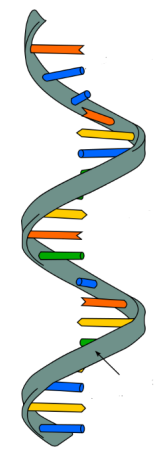
***Lipids***

* Pictures of lipid polymers (fats) have a glycerol molecule (three carbon atoms joined in a chain with oxygen and hydrogen atoms branching off) linked to one or more fatty acid molecules (long chains of carbon and hydrogen atoms)



***[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&docid=84EAmbRzZc0jpM&tbnid=N8dD6qTVGl7LpM:&ved=0CAcQjRw&url=http://biochemicalminds.wordpress.com/2014/04/06/finding-neverlandnucleotides-nucleic-acids-and-nucleosides/&ei=PGAtVLKzBJO4ggTouID4Bw&bvm=bv.76477589,d.cWc&psig=AFQjCNGC_-HeCg5QlFpakOT6J036IGa6nA&ust=1412346221269830)Nucleic Acids***

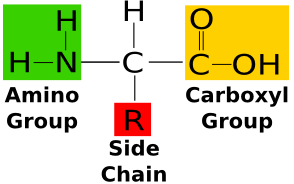
* Pictures of nucleic acid monomers (nucleotides) have a phosphate group (with a phosphorus atom surrounded by four oxygen atoms, PO42-), a 5-carbon sugar (looks like a pentagon), and a nitrogenous base (looks like one or two rings containing nitrogen atoms
* Pictures of the nucleic acid polymer DNA have a double helix structure (a winding staircase) that is composed of two chains of nucleotides. When “untwisted” the DNA molecule looks like a ladder. The phosphate groups and 5-carbon sugars of each nucleotide are located in the sides of the ladder, and the nitrogen bases form the middle “rungs” of the ladder.



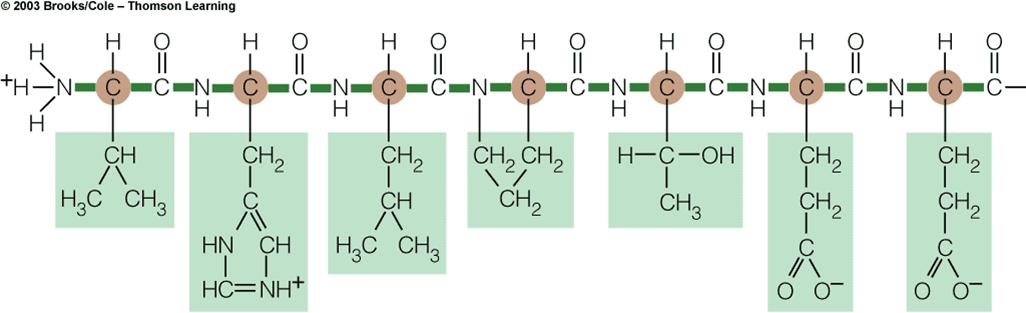
* Pictures of the nucleic acid polymer RNA show a single chain of nucleotides with the nitrogen bases “sticking out” from the chain.

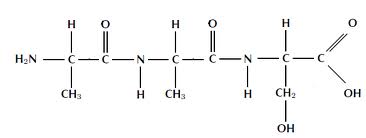
***Proteins***

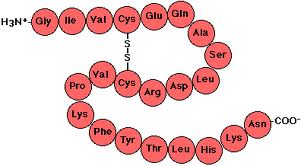
* Pictures of protein monomers (amino acids) have a central carbon atom bonded to four things: a single hydrogen atom, an amino group (contains nitrogen and hydrogen atoms), a carboxyl group (contains a carbon atom that is double-bonded to an oxygen atom), and an R group (changes for each of the 20 different amino acids)



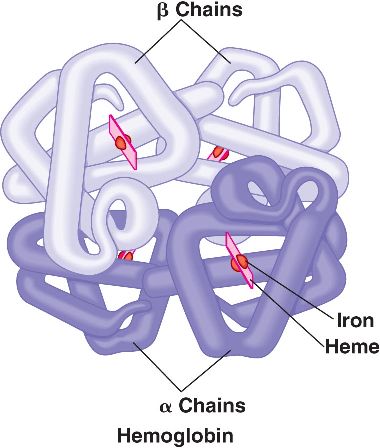
* Pictures of protein polymers (polypeptide) show a chain of amino acids, with the amino group of one amino acid bonded to the carboxyl group of the next amino acid in the chain.



[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&docid=IlyjuuIyjX3vqM&tbnid=pJbiThBjzbOaCM:&ved=0CAcQjRw&url=http://qatemplates.everythingscience.co.za/grade-12/02-organic-macromolecules/02-organic-macromolecules-06.cnxmlplus&ei=AGItVPS2HNTAggS-goLoDg&bvm=bv.76477589,d.cWc&psig=AFQjCNEj9LEOmztS2PN03R4pcYRyX1OZXA&ust=1412346739785315)

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&docid=PPWd10L6b6SNfM&tbnid=CSmm7J6UIWERMM:&ved=0CAcQjRw&url=http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/Polypeptides.html&ei=PGItVNu5Fc_PggS2o4HoAw&bvm=bv.76477589,d.cWc&psig=AFQjCNEj9LEOmztS2PN03R4pcYRyX1OZXA&ust=1412346739785315)

* Pictures of a “full protein” may show multiple polypeptide chains folded around one another.



***Directions:*** *Place a check mark in the column of each kind of macromolecule that has each characteristic. Some may need more than one check*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristics** | **Carbohydrate** | **Lipid** | **Protein** | **Nucleic Acid** |
|  |  |  |  |  |
|  |  |  |  |  |
| http://ww1.prweb.com/prfiles/2011/12/01/9006172/adenine-nucleotide.jpg |  |  |  |  |
| http://www.chemeddl.org/resources/models360/files/107526/d-glucose-beta%20Haworth.png |  |  |  |  |
| Enzymes (molecules that speed up chemical reactions) are an example of this type of macromolecule |  |  |  |  |
| Includes fats and oils |  |  |  |  |
| Polymers formed from amino acids |  |  |  |  |
| http://www.geneticliteracyproject.org/wp/wp-content/uploads/2012/09/blue-DNA.jpg |  |  |  |  |
| Always contains carbon and hydrogen |  |  |  |  |
| http://web.visionlearning.com/custom/chemistry/custom/images/starch_yellow2.gif |  |  |  |  |
| DNA and RNA are examples of this type of macromolecule |  |  |  | ` |
| Table sugar (sucrose) is an example of this type of macromolecule |  |  |  |  |
| **Characteristics** | **Carbohydrate** | **Lipid** | **Protein** | **Nucleic Acid** |
| http://www.worldofmolecules.com/foods/Sucrose.png |  |  |  |  |
| Stores genetic information |  |  |  |  |
| Is a polymer |  |  |  |  |
| Controls cellular activities |  |  |  |  |
|  |  |  |  |  |
| The polymer of this macromolecule is called a polypeptide |  |  |  |  |
| Is made of nucleotides |  |  |  |  |
| Is an organic compound |  |  |  |  |
| Includes starches |  |  |  |  |
| Made up of monomers |  |  |  |  |
| Is an organic compound |  |  |  |  |
| http://education-portal.com/cimages/multimages/16/example-of-a-dipeptide.jpg |  |  |  |  |
| Formed by dehydration synthesis |  |  |  |  |
| Its monomers usually end in “ose” |  |  |  |  |
|  |  |  |  |  |
| Breaks apart by hydrolysis |  |  |  |  |
| Important for defense, structure, storage, and transport |  |  |  |  |